

IN THE CLAIMS

1. (Currently Amended) A device functioning as an electric motor or actuator ~~(100, 100')~~ comprising:

- a housing ~~(110)~~ encapsulating a rotating member ~~(120, 120')~~,
- one or several arrangements ~~(130, 130')~~ for generating a magnetic field due to electrical current,
- a displaceable shaft ~~(140, 140')~~ at least partly having exterior grooves ~~(141, 141')~~,
- said rotating member having at least a portion ~~(121, 121')~~ with inner grooves ~~(122, 122')~~ substantially corresponding to grooves on said shaft ~~(140, 140')~~,
- a carrying sleeve ~~(123)~~ being arranged to be provided on an outer surface of said rotating member ~~(120, 120')~~ substantially perpendicular to extension direction of said grooves ~~(122, 122')~~ for interaction with said arrangement ~~(130, 130')~~ and rotating said rotating member;

~~characterised in~~

~~that~~ wherein said sleeve has an interior shape corresponding to an outer surface of the rotating member and an outer surface comprising portions ~~(1231)~~ for receiving a number of magnetic elements ~~(150, 150')~~, said portions being arranged as flat portion and/or grooves for receiving said magnetic elements.

2. (Original) The device of claim 1, wherein said rotating element is a ball nut.

3. (Original) The device of claim 2, wherein said shaft is arranged as ball screw.

4. (Original) The device of claim 1, wherein said rotating element is a nut.
5. (Original) The device of claim 4, wherein said shaft is at least partly threaded.
6. (Original) The device of claim 1, comprising an air gap between said magnetic element and said sleeve.
7. (Currently Amended) The device according to claim 1 ~~any of preceding claims~~, wherein said shaft is made in sections of different parts.
8. (Original) The device of claim 7, wherein said parts are made of different material.
9. (Currently Amended) A device ~~functioning~~ adapted to function as an electric motor or actuator ~~(100)~~, the device comprising:
 - a housing ~~(110)~~ encapsulating a rotating member ~~(120)~~,
 - one or several arrangements ~~(130)~~ for generating a magnetic field due to electrical current,
 - a displaceable shaft ~~(140)~~ at least partly being arranged as a ball screw,
 - said rotating member having a portion ~~(121)~~ being provided as a ball nut,
 - magnetic elements ~~(150, 150')~~ arranged on an outer surface of a carrying sleeve arranged on said rotating member ~~(120')~~ substantially parallel with extension of said shaft for interaction with said arrangement ~~(130)~~ and rotating said ball nut;~~characterised in~~

~~that~~ wherein said sleeve has an interior shape corresponding to an outer surface of the rotating member and an outer surface comprising portions ~~(1231)~~ for receiving a number of magnetic elements ~~(150, 150')~~, said portions being arranged as flat portion and/or grooves for receiving said magnetic elements.

10. (Currently Amended) The ~~arrangement~~ device of claim 9, wherein said sleeve is made of a laminated material.
11. (Currently Amended) The ~~arrangement~~ device of claim 10, wherein said shaft comprises ball return.
12. (Currently Amended) The ~~arrangement~~ device of claim 11, wherein said ball return comprises a notice ~~(6211)~~ arranged diagonally on the ball nut ~~(621)~~, a preload system ~~(6212)~~, a return cap ~~(6213)~~ and a wiper ~~(6214)~~ arranged between the return cap and the shaft ~~(6142)~~, grooves or ball tracks ~~(6141)~~ in which the balls ~~(6125)~~ run.
13. (Currently Amended) The ~~arrangement~~ device of claim 12, wherein said ball return comprises a single liner screw in which a notch ~~(6211)~~ forces balls ~~(6125)~~ passing through the notch to change track to the adjacent track.
14. (Currently Amended) The ~~arrangement~~ device of claim 12, wherein said ball return comprises a ball nut having multi linear ball return.
15. (Currently Amended) The ~~arrangement~~ device of claim 12, wherein said ball return comprises a single- or multi liner system, in which the balls are lead back after each circulation around the shaft and the liner picks the balls

out of a ball track and guides them with its path over the portion between the ball tracks of the shaft.

16. (Currently Amended) The ~~arrangement~~device of claim 9, wherein the shaft ~~(9141)~~ is provided with a return cap ~~(9147)~~ having a return channel~~(9148)~~, wherein return cap system picks the balls up at one end of the nut and lead them back, through a hole in the nut, to the other side.
17. (Currently Amended) The ~~arrangement~~device of claim 12, wherein said ball return comprises a liner return ~~(10142)~~ placed in the shaft ~~(10141)~~ and the balls ~~(10125)~~ are lead through its path over a portion between the ball tracks ~~(10122)~~ of the nut.
18. (Currently Amended) The ~~arrangement~~device of claim 9, wherein said shaft comprises means for transforming rotation of the nut to an axial movement.
19. (Currently Amended) The ~~arrangement~~device of claim 9, wherein said housing is at least partly filled with a lubrication agent.
20. (Currently Amended) A vehicle having steering wheels and ~~including~~an actuator (100, 100') , the actuator comprising:
 - a housing ~~(110)~~ encapsulating a rotating member~~(120, 120')~~,
 - one or several arrangements ~~(130, 130')~~ for generating a magnetic field due to electrical current,
 - a displaceable shaft ~~(140, 140')~~ at least partly having exterior grooves~~(141, 141')~~,

- said rotating member having a portion ~~(121, 121')~~ with inner grooves ~~(122, 122')~~ corresponding to grooves on said shaft ~~(140, 140')~~,
- a carrying sleeve having magnetic elements ~~(150, 150')~~ arranged on an outer surface of said sleeve, being arranged on said rotating member ~~(120')~~ substantially parallel with extension of said grooves ~~(122, 122')~~ for interaction with said arrangement ~~(130, 130')~~ and rotating said rotating member;

~~characterised in~~

~~that~~ wherein said sleeve has an interior shape corresponding to an outer surface of the rotating member and an outer surface comprising portions ~~(1231)~~ for receiving a number of magnetic elements ~~(150, 150')~~, said portions being arranged as flat portion and/or grooves for receiving said magnetic elements.

21. (Currently Amended) A method of actuating ~~and object using~~ a device functioning as an electric motor or actuator ~~(100)~~, wherein the device comprises~~comprising~~:

- a housing ~~(110)~~ encapsulating a rotating member ~~(120)~~,
- one or several arrangements ~~(130)~~ for generating a magnetic field due to electrical current,
- a displaceable shaft ~~(140)~~ at least partly being arranged as a ball screw,
- said rotating member having a portion ~~(121)~~ being provided as a ball nut, and

wherein the method comprises~~comprising the steps of~~:

arranging magnetic elements ~~(150, 150')~~ on an outer surface of said rotating member ~~(120')~~ substantially parallel with extension of said shaft for interaction with said arrangement ~~(130)~~ and rotating said ball nut, and energizing said stators to rotate said rotating member and

transforming station of said rotating member to a linear movement.

22. (Currently Amended) A carrying sleeve for use in a device functioning as an actuator—~~(100, 100')~~, said carrying sleeve comprises an outer surface provided with at least one space for receiving at least one magnetic element—~~(150, 150')~~, and inner space for mounting on an outer surface of a rotatable member—~~(120, 120')~~,
~~characterised in~~ wherein
said space comprises portions ~~(1231)~~ for receiving a number of magnetic elements—~~(150, 150')~~, said portions being arranged as flat portions and/or grooves for receiving said magnetic elements.